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| 10/536,825 | 08/15/2005 | Kazuhisa Watanabe | 055471-0114 | 2217 |
| 22428 | 7590 | 11/15/2006 | | |
| FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007 | | | EXAMINER ROMAN, LUIS ENRIQUE | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2836 | |

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/536,825

Applicant(s)

WATANABE ET AL.

Examiner

Luis Roman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-12 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Applicant amendment filed on 07/19/06 has been entered. Accordingly claim 1 has been amended. New claims 2-12 were added. It also included remarks/arguments.

The objection to the claim 1 has been withdrawn.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 7,084,549. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of the application is recited in patented claim 1. Claim 1 of the application does not recite the resistor connected to the feeder lines (included in claim 2 of the application). Claim 1 of the application does not recite the voltage applied to the actuator being 60% charged state, this specific value may be selected by the control device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Miller et al. (US 3872330) in view of Stortz et al. (US 5436648).

Regarding claim 1 Miller et al. discloses a plurality of piezoelectric actuators, in which each of the actuators has a first and a second piezoelectric sheet attached to opposed surfaces of a plate interposed between the first and the second piezoelectric sheets (Fig. 4), comprising: an actuator mechanically moving a mechanical component directly or indirectly connected to each of the piezoelectric actuators (implicitly disclose, a piezoelectric device produces movements/displacement which are related to mechanical events), wherein the controller has a function to off-control the drive voltage applied to the first or the second piezoelectric sheet of each of the piezoelectric actuators selected to be on-controlled, and to simultaneously, on-control the first or the second piezoelectric sheet of any other of the piezoelectric actuators next so as to apply the drive voltage thereto, and wherein a discharging current is allowed to flow from the first or the second piezoelectric sheet of any one of the piezoelectric actuators subjected to off-control, and the first or the second piezoelectric sheet of any other one of the piezoelectric actuators subjected to on-control is directly charged through the positive side or the negative side feeder line (Fig. 1 shows a control 14).

Miller et al. does not specifically disclose the plurality of piezoelectric devices connected to a positive side feeder line directly connected in common to a side of the first piezoelectric sheet opposite to the side attached to the plate; and a negative side feeder line directly connected in common to a side of the second piezoelectric sheet opposite

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to the side attached to the plate a controller to selectively on-control and charge the second or the first piezoelectric sheet by applying a drive voltage to the first and the second piezoelectric sheets, by selectively connecting the positive side or the negative side feeder line to the plate side of the first or the second piezoelectric sheet.

Stortz et al. teaches a piezoelectric device connected to a positive side feeder line directly connected in common to a side of the first piezoelectric sheet opposite to the side attached to the plate (Fig. 3A element 54); and a negative side feeder line directly connected in common to a side of the second piezoelectric sheet opposite to the side attached to the plate (Fig. 3A element 54) a controller to selectively on-control and charge the second or the first piezoelectric sheet by applying a drive voltage to the first and the second piezoelectric sheets, by selectively connecting the positive side or the negative side feeder line to the plate side of the first or the second piezoelectric sheet (Abstract & Fig. 3A control signals 60, 61 from control device),

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Miller et al. device with the Stortz et al. teachings because it provides an improved device that eliminates or at least substantially reduces the problems of drive systems which utilize analog circuitry and digital type drive systems (Stortz et al. Col. 2 lines 25-59).

Regarding claims 3, 4 Miller et al. discloses the driver for the plurality of piezoelectric actuators according to claim 1.

Stortz et al. implicitly discloses that the controller is connected to a power supply section to function.

Stortz et al. further discloses comprising a switching control section for switching the drive voltage (Fig. 3A elements 56, 58).

Miller et al. teaches a common resistor for limiting drive current (Fig. 2 element 25<large value that also is used to define the time constant>).

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Claims 5-8 & 10-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Miller et al. (US 3872330) in view of Stortz et al. (US 5436648) and Suzuki et al. (US 4551735).

Regarding claim 5-8 & 10-12 Miller et al. in view of Stortz et al. discloses the driver for the plurality of piezoelectric actuators according to claims above.

Miller et al. in view of Stortz et al. discloses a plurality of transistors but does not disclose a plurality of LEDs and phototransistors.

Suzuki et al. (US 4551735) teaches the usage of LEDs and phototransistors instead of transistors to drive a piezoelectric device Fig. 10 elements 39, 40, 41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Miller et al. in view of Stortz et al. device with the Stortz et al. teachings because LEDs and phototransistors improve isolation and energy consumption.

Regarding claim 6 Stortz et al. teaches transistors mutually connected corresponding to the plurality of piezoelectric actuators (Fig. 3B).

Regarding claim 7 it is intrinsically disclosed phototransistors need LED in general as the control electrode if there are phototransistors mutually connected the LEDs need to be connected in series forward direction to activate the phototransistors.

Regarding claims 8 Stortz et al. teaches the collector of the transistor connected to the positive feeder line (Fig. 3B).

Regarding claim 10 Stortz et al. teaches wherein joints of pairs of the plurality of transistors are connected to common terminals of the plurality of piezoelectric actuators (Miller et al. Fig. 4 where each Si is replaced by the pair of transistors from Stortz et al.)

Regarding claim 11 it is intrinsically disclosed when the plurality of light emitting diodes are combined with the plurality of phototransistors, an insulating state between the positive and negative side feeder lines and the controller is formed (there is no electrical connection between the LED and the phototransistors, the link is light).

Regarding claim 12 Stortz et al. discloses a printer having a driver for a plurality of actuators according to claim 1 (abstract).

Allowable Subject Matter

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant's arguments filed on 07/19/06 with respect to claim 1 has been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is 571-272-5527. The examiner can normally be reached on Mon – Fri from 7:15 AM to 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LR/102906

Luis E. Román
Patent Examiner
Art Unit 2836



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